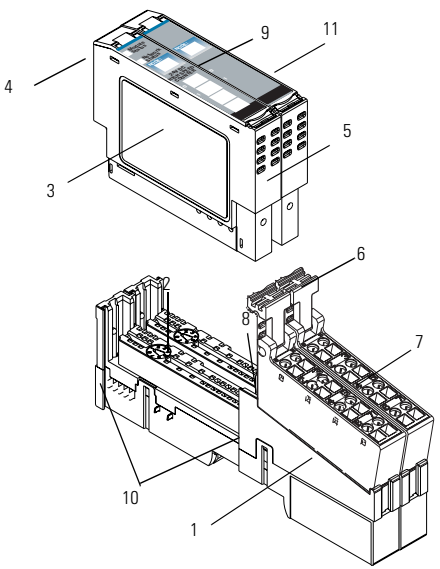
Installation Instructions

POINT I/O 24V dc Very High Speed Counter Module

(Cat. No. 1734-VHSC24)



	Description		Description
1	Mounting Base[1]	7	Removable Terminal Block (RTB)[1]
2	Mechanical Keying (orange)	8	DIN Rail Locking Screw (orange)
3	Module Wiring Diagram	9	Slide-in Writable Label
4	Module Locking Mechanism	10	Interlocking Side Pieces
5	Insertable I/O Module 1	11	Insertable I/O Module 2
6	RTB Removal Handle		

[1] Wiring Base Assembly consists of item 1) mounting base, 1734-MB and item 7) removable terminal block, 1734-RT❑❑.

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Publication 1734-IN003B-EN-P - October 2000

General

The VHSC is a two-module set. Module 1 houses the VHSC functionality while module 2 provides screw terminals necessary to access chassis ground (Chas Gnd) and common (C). Module 2 also connects screw 4 to 5 and screw 6 to 7 for ease of wiring power to the input device. Module 2 is not necessary for VHSC functionality; it serves only to ease customer wiring. Module 2 does not use a node address, or consume power from the PointBus. Mount module 2 adjacent to module 1.

Installing the Mounting Base

To install the mounting base on the DIN rail, proceed as follows.

1. Position the mounting base vertically above the installed units (adapter, power supply or existing module).
2. Slide the mounting base down allowing the interlocking side pieces to engage the adjacent module or adapter.
3. Press firmly to seat the mounting base on the DIN rail. The mounting base will snap into place.
4. To remove the mounting base from the DIN rail, remove the module, and use a small bladed screwdriver to rotate the base locking screw to a vertical position. This releases the locking mechanism. Then lift straight up to remove.

Installing the I/O Module

The module can be installed before, or after base installation. Make sure that the mounting base is correctly keyed before installing the module into the mounting base. In addition, make sure the mounting base locking screw is positioned horizontal referenced to the base.

1. Using a bladed screwdriver, rotate the keyswitch (2) on the mounting base clockwise until the number required for the type of module being installed aligns with the notch in the base.
2. Make certain the DIN rail locking screw is in the horizontal position. (You cannot insert the module if the locking mechanism is unlocked.)

3. Insert the module straight down into the mounting base and press to secure. The module will lock into place.

Installing the Removable Terminal Block (RTB)

A removable terminal block is supplied with your wiring base assembly. To remove, pull up on the RTB handle. This allows the mounting base to be removed and replaced as necessary without removing any of the wiring. To reinsert the removable terminal block, proceed as follows.

1. Insert the end opposite the handle into the base unit. This end has a curved section that engages with the wiring base.
2. Rotate the terminal block into the wiring base until it locks itself in place.
3. If an I/O module is installed, snap the RTB handle into place on the module.

Removing a Mounting Base

To remove a mounting base, you must remove any installed module in the base, and the module installed to the right of the base to be removed. Remove the removable terminal block (if wired).

1. Unlatch the RTB handle on the I/O module.
2. Pull on the RTB handle to remove the removable terminal block.
3. Press on the module lock on the top of the module.
4. Pull on the I/O module to remove from the base.
5. Use a small bladed screwdriver to rotate the orange base locking screw to a vertical position. This releases the locking mechanism.
6. Then lift straight up to remove.

European Communities (EC) Directive Compliance

If this product has the CE mark it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

EMC Directive

This product is tested to meet the Council Directive 89/336/EC Electromagnetic Compatibility (EMC) by applying the following standards, in whole or in part, documented in a technical construction file:

- EN 50081-2 EMC — Generic Emission Standard, Part 2 — Industrial Environment
- EN 50082-2 EMC — Generic Immunity Standard, Part 2 — Industrial Environment

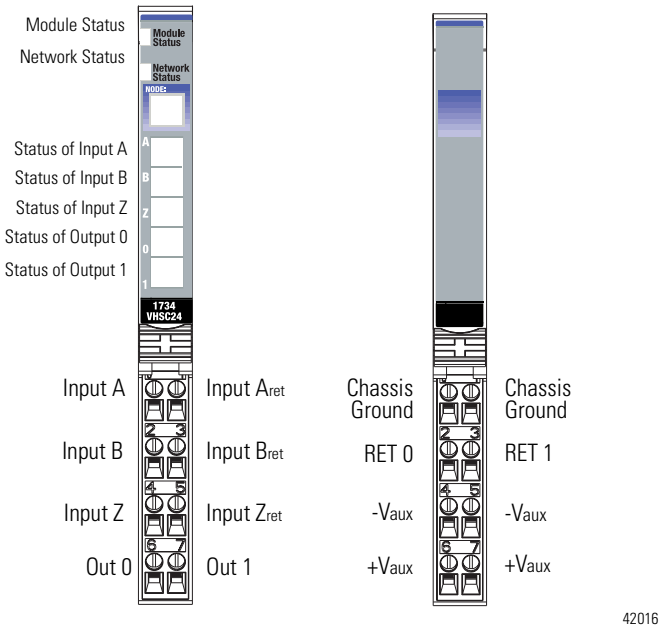
This product is intended for use in an industrial environment.

Low Voltage Directive

This product is tested to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 - Equipment Requirements and Tests. For specific information required by EN 61131-2, see the appropriate sections in this publication, as well as publication 1770-4.1, Allen-Bradley Industrial Automation Wiring and Grounding Guidelines.

Open style devices must be provided with environmental and safety protection by proper mounting in enclosures designed for specific application conditions. See NEMA Standards publication 250 and IEC publication 529, as applicable, for explanations of the degrees of protection provided by different types of enclosures.

Wiring the 24V dc Very High Speed Counter Module



	Module 1		Module 2	
0	A	1 Aret	0 Chas Gnd	1 Chas Gnd
2	B	3 Bret	2 RET 0	3 RET 1
4	Z	5 Zret	4 -Vaux	5 -Vaux
6	Out 0	7 Out 1	6 +Vaux	7 +Vaux

Module 1 Terminations		Module 2 Terminations	
0	A	0	Chassis Ground
1	Aret	1	Chassis Ground
2	B	2	Out 0 RET
3	Bret	3	Out 1 RET
4	Z	4	Vaux -
5	Zret	5	Vaux -
6	Out 0	6	Vaux +
7	Out 1	7	Vaux +

Communicating with the 1734-VHSC24

I/O messages are sent to (consumed) and received from (produced) the POINT I/O modules. These messages are mapped into the processor's memory. This POINT I/O input/output module produces 6 bytes of input data ((scanner Rx) (status). It consumes 2 bytes of I/O data ((scanner Tx).

Default Data Map for the 1734-VHSC Counter Module

Message size: 6 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (scanner Rx)	Channel 0 value of present counter state (LSW)															
	Channel 0 value of present counter state (MSW)															
	PE	EF	NR	0	FS	FS	OS	OS	0	ZS	BS	AS	C1	C0	ZD	0
	Where:PE = Programming error EF = EEPROM fault status NR = Not ready status bit FS = Output fault status bit - bit 10 for output 0, bit 11 for output 1 OS = Output on/off status bit - bit 8 for output 0, bit 9 for output 1 ZS = Z input status BS = B input status AS = A input status C = Stored data count ZD = Zero frequency detected LSW = Least significant word MSW = Most significant word															

Message size: 2 bytes

	07	06	05	04	03	02	01	00
Consumes (scanner Tx)	0	0	0	0	0	VR	CP	CR
	DS	ES	OE	FO	DS	ES	OE	FO
	Where:VR = Value reset of stored/accumulated count CP = Counter preset CR = Counter reset DS = Diagnostic speed ES = Electronic fuse select OE = Output enable FO = Force output							

Configuring Your Very High Speed Counter Module

Parameter	Set/Get	Description	Bytes
1	Set/Get	Counter Configuration (see page 9)	1
2	Set/Get	Filter Selection (see page 10)	1
3	Set/Get	Decimal Position	1
4	Set/Get	Active Output Assembly	1
5	Set/Get	Time Base Value/PWM Period	2
6	Set/Get	Gate Interval	1
7	Set/Get	Channel Scalar (see page 10)	1
8	Set/Get	Output 0 Ties	1
9	Set/Get	Output 1 Ties	1
10	Set/Get	Channel Rollover Value	4
11	Set/Get	Channel Preset Value	4
12	Set/Get	ON Value 1	4
13	Set/Get	OFF Value 1	4
14	Set/Get	ON Value 2	4
15	Set/Get	OFF Value 2	4
16	Set/Get	ON Value 3	4
17	Set/Get	OFF Value 3	4
18	Set/Get	ON Value 4	4
19	Set/Get	OFF Value 4	4
20	Set/Get	PWM Safe State Value	2
21	Set/Get	Counter Control Safe State	1
22	Set/Get	Output Control Safe State	1

Counter Configuration

07	06	05	04	03	02	01	00	
ZI	**MD**			**CF**				**Counter 0**
				0	0	0	0	Counter
				0	0	0	1	Encoder X1
				0	0	1	0	Encoder X2
				0	0	1	1	PWM
				0	1	0	0	Encoder X4
				0	1	0	1	Period/Rate
				0	1	1	0	Continuous/Rate
				0	1	1	1	Rate Measurement
	0	0	0					Store Count Disabled
	0	0	1					Mode 1 - store/continue
	0	1	0					Mode 2 - store/wait/resume
	0	1	1					Mode 3 - store, reset/wait/start
	1	0	0					Mode 4 - store, reset/start
	1	0	1					Reserved
	1	1	0					Reserved
	1	1	1					Reserved
0								Z input - 0 = not inverted
1								Z input - 1 = inverted

Filter Selection

07	06	05	04	03	02	01	00	
0	**ZF**	**BF**	**AF**	**FS**				
				0	0	0	0	No Filter
				0	0	0	1	50kHz (10µs + 0µs/-1.6µs)
				0	0	1	0	5kHz (100µs + 0µs/-13.2µs)
				0	1	0	0	500Hz (1.0ms + 0ms/-125µs)
				1	0	0	0	50Hz (10ms + 0ms/-1.25ms)
			0					A input not filtered
			1					A input filtered
		0						B input not filtered
		1						B input filtered
	0							Z input not filtered
	1							Z input filtered

Scalar Selection

07	06	05	04	03	02	01	00	Scalar[1]
0	0	0	0	0	0	0	1	Z - F_{min} = 0.149Hz
0	0	0	0	0	0	1	0	Z/2 - F_{min} = 0.298Hz
0	0	0	0	0	1	0	0	Z/4 - F_{min} = 0.596Hz
0	0	0	0	1	0	0	0	Z/8 - F_{min} = 1.192Hz
0	0	0	1	0	0	0	0	Z/16 - F_{min} = 2.384Hz
0	0	1	0	0	0	0	0	Z/32 - F_{min} = 4.768Hz
0	1	0	0	0	0	0	0	Z/64 - F_{min} = 9.537Hz
1	0	0	0	0	0	0	0	Z/128 - F_{min} = 19.073Hz

1 Where Fmin indicates the frequency at which the zero frequency detect is asserted due to counter overflow.

Assemblies

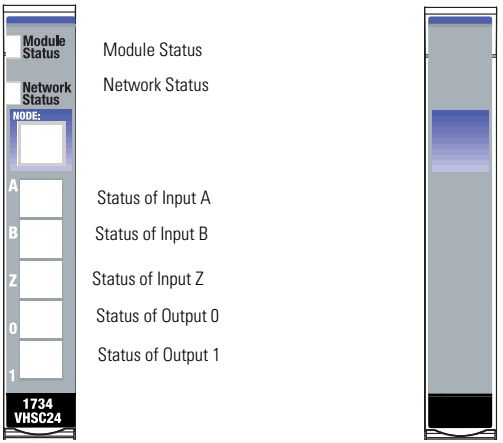
The Very High Speed Counter Module uses several words to communicate real time input and output data as well as non-real time module information (i.e. description, revision, etc) and configuration. The following table shows the words which can be exchanged.

Data may be read (get) or written (set) using an Explicit Message.

Instances (Dec/Hex)	**Services**	**Field**	**Bytes**
#101 (0x65)	Get	Present Channel Data	4
		Status	2
#102 (0x66)	Get	Stored Channel Data	4
		Status	2
#103 (0x67)	Get	Present Channel Data	4
		Stored Channel Data	4
		Status	2
#104 (0x68)	Get	Programming Error Code	2
#105 (0x69)	Set/Get	Counter Control	1
		Output Control	1
#106 (0x6a)	Set/Get	PWM Value	2
#107 (0x6b)	Set/Get	PWM Value	2
		Counter Control	1
		Output Control	1
#108 (0x6c)	Set/Get	Counter Configuration	1
		Filter Selection	1
		Decimal Position	1
		Active Output Assembly	1
		Time Base or PWM Period	2
		Gate Interval	1
		Scalar	1

		Output 0 Ties	1
		Output 1 Ties	1
		Rollover Value	4
		Preset Value	4
		ON Value # 1	4
		OFF Value #1	4
		ON Value # 2	4
		OFF Value #2	4
		ON Value # 3	4
		OFF Value #3	4
		ON Value # 4	4
		OFF Value #4	4
		PWM Safe State Value	2
		Counter Control SSV	1
		Output Control SSV	1

Troubleshooting with the Indicators



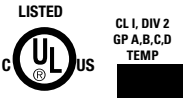
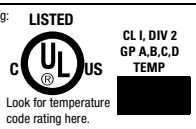
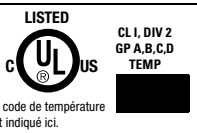
Indication	Probable Cause
Module Status	
Off	No power applied to device
Green	Device operating normally
Flashing Green	Device needs commissioning due to configuration missing, incomplete or incorrect.
Flashing Red	Recoverable fault.
Red	Unrecoverable fault may require device replacement
Flashing Red/Green	Device is in self-test

Indication	Probable Cause
Network Status	
Off	Device is not on-line - Device has not completed dup_MAC_id test. - Device not powered - check module status indicator
Flashing Green	Device is on-line but has no connections in the established state.
Green	Device on-line and has connections in the established state.
Flashing Red	One or more I/O connections in timed-out state
Red	Critical link failure - failed communication device. Device detected error that prevents it communicating on the network.
Flashing Red/Green	Communication faulted device - the device has detected a network access error and is in communication faulted state. Device has received and accepted an Identify Communication Faulted Request - long protocol message.

Indication	Probable Cause
Input Status	
Off	Input inactive
Yellow	Input is active and under control
Flashing Yellow	Input is toggling on and off

Indication	Probable Cause
Output Status	
Off	Output inactive
Yellow	Output is active and under control
Flashing Yellow	Output is toggling
Flashing Red	Output is faulted (open, short or no output power)
Flashing Red/Yellow	Output is toggling and faulted (possibly open)

Safety Approvals

C-UL and UL Hazardous Location Approval	**Approbation d'utilisation dans des environnements dangereux par la C-UL/UL**
C-UL and UL certifies products for general use as well as for use in hazardous locations. **Actual C-UL and UL certification is indicated by the product label** as shown below, and not by statements in any user documentation.	La C-UL/UL certifie des produits pour une utilisation générale aussi bien que pour une utilisation en environnements dangereux. **La certification C-UL/UL en vigueur est indiquée par l'étiquette produit** et non par des indications dans la documentation utilisateur.
Example of the C-UL and UL certification product label:	Exemple d'étiquette de certification d'un produit par la C-UL/UL : 
To comply with C-UL and UL certification for use in hazardous locations, the following information becomes a part of the product literature for this C-UL and UL-certified industrial control product. • This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or non-hazardous locations only. • The products having the appropriate C-UL and UL markings (that is, Class I, Division 2, Groups A, B, C, D) are certified for use in other equipment where the suitability of combination (that is, application or use) is determined by the C-UL and UL or the local inspection office having jurisdiction	Pour satisfaire à la certification C-UL/UL en environnements dangereux, les informations suivantes font partie intégrante de la documentation des produits de commande industrielle certifiés. • Cet équipement ne convient qu'à une utilisation en environnements de Classe I, Division 2, Groupes A, B, C, D ou non dangereux. • Les produits portant le marquage C-UL/UL approprié (c'est-à-dire Classe I, Division 2, Groupes A, B, C, D) sont certifiés pour une utilisation avec d'autres équipements, les combinaisons d'applications et d'utilisations étant déterminées par la C-UL/UL ou le bureau local d'inspection qualifié.
Important: Due to the modular nature of a programmable control system, the product with the highest temperature rating determines the overall temperature code rating of a programmable control system in a Class I, Division 2, location. The temperature code rating is marked on the product label as shown.	Important: De par la nature modulaire des systèmes de commande programmables, le produit ayant le code de température le plus élevé détermine le code de température global du système dans un environnement de Classe I, Division 2. Le code de température est indiqué sur l'étiquette produit.
: Temperature code rating: 	Code de température : 
The following warnings apply to products having C-UL and UL certification for use in hazardous locations.	Les avertissements suivants s'appliquent aux produits ayant la certification C-UL/UL pour une utilisation en environnements dangereux.
WARNING: Explosion Hazard • Substitution of components may impair suitability for Class I, Division 2. • Do not replace components unless power has been switched off or the area is known to be non-hazardous. • Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous. • Do not disconnect connectors unless power has been switched off or the area is known to be non-hazardous. Secure any user-supplied connectors that mate to external circuits on this equipment by using screws, sliding latches, threaded connectors, or other means such that any connection can withstand a 15 Newton (3.4 lb.) separating force applied for a minimum of one minute.	**AVERTISSEMENT : Risque d'explosion** • La substitution de composants peut rendre ce matériel inadapté à une utilisation en environnements de Classe I, Division 2. • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de remplacer des composants. • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement. • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs fournis par l'utilisateur pour se brancher aux circuits externes de cet équipement à l 'aide de vis, loquets coulissants, connecteurs filetés ou autres, de sorte que les connexions résistent à une force de séparation de 15 Newtons (1,5 kg - 3,4 lb.) appliquée pendant au moins une minute. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.
C-UL and UL logo is a registered trademark of the Underwriters Laboratories.	Les sigles C-UL et UL sont des marques déposées de la Underwriters Laboratories.

Specifications

Specifications - 1734-VHSC24 Very High Speed Counter Module	
Input Specifications	
Number of Inputs	1 - 1 group of A/Areturn, B/Breturn and Z/Zreturn
Input Voltage	15-24V dc
Input Current	6.1mA @ 15V dc 10.2mA @ 24V dc
Input OFF-State Current	≤0.250mA max
Input OFF-State Voltage	≤1.8V dc
Input ON-State Current	≥5mA
Input ON-State Voltage	≥12.5V dc
Maximum ON-State Voltage	Refer to derating curve below.
Input Filter Selections	Off 10µs 100µs 1.0ms 10.0ms
Maximum Input Frequency	1.0MHz counter and encoder X1 configurations 500kHz encoder X2 configuration (no filter) 250kHz encoder X4 configuration (no filter)
Output Specifications	
Number of Outputs	1 isolated group of 2 capable of 0.5A @ 24V dc
Output Control	Outputs can be tied to any of 4 compare windows
Output Supply Voltage Range	10-28.8V dc
OFF-State Leakage Current	≤0.5mA
ON-State Voltage Drop	≤0.3V dc @ 0.5A
ON-State Current	0.5A maximum
Short Circuit Current	6A - Outputs are short circuit protected and either cycle until the fault is corrected, or latch off (depending upon programming) Short circuit detected when output is turned on.
Open Wire Detection	Open wire detected when output is turned off
Delay Time OFF to ON ON to OFF	 25µs (load dependent) 150µs (load dependent)

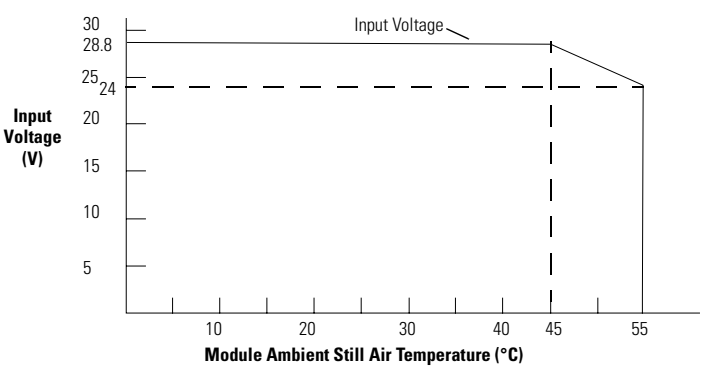
General Specifications	
Module Location	1734-TB, -TBS, -TB3, -TB3S wiring base assembly
Keyswitch Position	2
Pointbus Current	180mA maximum
Power Dissipation	1.9W maximum @ rated load
Thermal Dissipation	6.5 BTU/hr maximum @ rated load
Isolation Voltage (minimum)	Prequalified for 1250V ac/rms between: **Module 1** System side (PointBus) Chassis ground A/B/Z inputs O0/O1 and user power supply **Module 2** System side Chassis ground Vaux ± User power supply common
External dc Power (does not represent power required to supply outputs)	No additional external power required to power module
Field Power Bus	24V dc nominal; range 10-28.8V dc
Dimensions Inches (Millimeters)	2.21H x 0.47W x 2.97L (56.0H x 12.0W x 75.5L)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 -20 to 55°C (-4 to 131°F) -40 to 85°C (-40 to 185°F) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	14 AWG ($2.5mm^2$) - 22 AWG ($0.25mm^2$) solid or stranded wire rated at 75°C or higher 3/64 inch (1.2mm) insulation maximum 2[2]
Terminal Base Screw Torque	7 pound-inches (0.6Nm)

Field Wiring Terminations	Module 1 0 - A 1 - A_{ret} 2 - B 3 - B_{ret} 4 - Z 5 - Z_{ret} 6 - Output 0 7 - Output 1 Module 2 0 - Chassis ground 1 - Chassis ground 2 - Return 0 3 - Return 1 4 - -V 5 - -V 6 - +V 7 - +V
Mass	1.15 oz/32.60 grams
Agency Certification (when product is marked)	C-UL Listed C-UL Class I, Division 2, Groups A, B, C and D certified UL Listed CE marked for all applicable directives. C-Tick marked for all applicable acts. DeviceNet compatible as certified by ODVA, Inc.
User Manual	Publication 1734-UM003❒-EN-P

1 Off/on delay is time from a valid output "on" signal to output energization. On/off delay is time from a valid output "off" signal to output deenergization.

2 Use this conductor category information for planning conductor routing as described in publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines.".

Input Derating Curve



Note: Exceeding the maximum input voltage can cause permanent damage to the input.

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